

**AUTOMATIC, MULTI-STAGE RICH-MEDIA CONTENT  
CREATION USING A FRAMEWORK BASED DIGITAL  
WORKFLOW - SYSTEMS, METHODS AND PROGRAM PRODUCTS**

5 Inventors: Hua CHEN; Shu-Chun Jean CHEN; Pierre DARMON; Shang Q. GUO;  
Keeranoor KUMAR; Edward C. SNIBLE and Kshitij M. VICHARE

**RELATED APPLICATION**

10 *U.S. A.* Serial No. \_\_\_\_\_ entitled "An XML-Based Textual Specification For Rich-Media  
Content Creation - Systems, Methods And Program Products", filed \_\_\_\_\_, (SOM9-2000-  
0010/1963-7399), assigned to the same assignee as that of the present invention and fully  
incorporated herein by reference.

**BACKGROUND OF THE INVENTION**

15 1. Field of Invention:

This invention relates to multi-media content creation systems, methods and program  
products. More particularly, the invention relates to automatic, multi-stage Rich Media Content  
creation using a framework based digital workflow – systems, methods and program products.

2. Description of Prior Art:

20 Serial No. 09/268,537 entitled "Framework for Progressive Hierarchical and Adapted  
Delivery On Which Media Presentations and Associated Media Method Data", filed March 12,  
1999 (SE9-98-030), assigned to the assignee as that of the present invention and fully  
incorporated herein by reference, describes a single, easy-to-use offering environment, known as  
*HotMedia* for incorporating Rich Media in an e-business application. *HotMedia* lets an author  
25 create Rich Media Content, such as video, streaming audio synchronized with images, 3D,  
animations, panoramas in a single file that can be easily added to a web page. For fast delivery

of Rich Media Content on a network, the data contained in a Rich Media file must be in a binary format. However, with a binary format, it is difficult for users to understand the file structure, add new content or modify the content stored in the file outside the authoring tool. The binary specification also restricts data interchange among applications; open formats and definitions for expansion, and third party tool development. The related application describes a straightforward and easy to understand means of creating Rich Media Content for e-business applications. Briefly, the related application describes combining videos, stills, panorama, sound and all forms of media as Rich Media in a Multi-Media Vehicle Repository (MVR) file editable with a Rich Media Content description file. The Rich Media Content description file, typically XML, enables users to specify a vocabulary that defines a media element and relations among the media elements thereby permitting the users to easily create and edit the Rich Media Content and compose various raw or compressed Rich Media components using any text editor.

What is needed in the art is automatic Rich Media Content creation using a text base Rich Media file permitting multi-stage development of composed Rich Media Content in a framework based digital workflow and executable on a multi-media player.

Prior art related to content creation systems includes:

USP 5,987,480 issued November 16, 1999, discloses a system and method for delivering documents having dynamic content embedded over the worldwide Internet or a local Internet or intra-net. A data source is stored on a server computer connected to the Internet, the data source containing content in a form representing more reducible the names in corresponding values. Document templates are created by embedding dynamic tags and flow directors in marked up language documents, the dynamic tags and flow directors containing one or more names of content stored in the data source. The document templates are stored on the server computer.

The server computer can receive requests from client computers connected to the Internet, the request identifying the desired documents to be delivered. In response to such a request, the server computer selects one of the document templates corresponding to the desired document, populates the document template with contents stored in the data source based on respective values or contents corresponding to names in the dynamic tags and flow directors, and delivers a populated document to the client computer.

USP 6,083,276 issued July 4, 2000, discloses a system for creating and configuring component-based applications using a text based descriptive attribute grammar. The system includes a parser, a plurality of element processors, an element mapper, an attribute mapper, and a parameter component. A parser tree is created from an application description file. Thereafter the parser tree is transformed into a plurality of components corresponding to instances of classes in an application framework. Components are then initialized from further process to lodge the component-based application.

None of the prior art discloses a Rich Media Content creation system in a framework based digital workflow for automatic, multi-stage content creation executable on a multi-media player.

### **SUMMARY OF THE INVENTION**

An object of the invention is a Rich Media Content creation system, method and program product.

Another object is a Rich Media Content creation using a framework based digital workflow.

Another object is automatically creating Rich Media Content in a framework based digital workflow.

Another object is automatic; multi-stage creation of Rich Media Content in a framework based digital workflow.

Another object is a system, method and program product for automatic, multi-stage creation of template based Rich Media content in a framework based digital workflow using  
5 standard text or graphical authoring tools.

These and other objects, features and advantages are achieved in an automatic, multi-stage rich media content creation system which includes a network based server executing an operating system, a text editing program, typically XML, and an authoring or batch processing program for combining Rich Media in a Multimedia Vehicle Repository (MVR) file. Video,  
10 stills, panoramas, sound, film, etc are combined as raw Rich Media from one or more sources and transmitted to the server in a framework over a digital network. The raw Rich Media is incorporated into the framework as a series of related frames. The raw Rich Media is stored on a storage device, typically a disk at the network based server. A creator using a standard graphical or text editing tools has access to the raw media assets on the disk for preparing a textual  
15 specification description, typically XML in an electronic template of desired Rich Media Content. The template and raw media assets are transmitted by the creator to the server for combining the raw media assets and the XML textual specification in the template as a composed MVR file using the batch-processing program. The composed in the template MVR file and textual specification may be returned to the creator for further editing of the  
20 specification, if necessary, and/or stored on the server disk, for access by other creators. The template based, composed or edited MVR file of Rich Media Content and related textual specification can be transmitted to other servers on the network for automatic, multistage creation of Rich Media content by several user groups. One user group can create a template

based composed or edited MVR file which another group accesses via the network to inject other content into the template for revising the XML text specification to create another embodiment of the Rich Media Content.

## **DESCRIPTION OF THE DRAWINGS**

The invention will be further understood from the following detailed description of a preferred embodiment, taken in conjunction with an appended drawing, in which:

Fig. 1 is a representation of a network based server system including authoring tools and session manager for translating raw Rich Media assets in binary format into an editable, textual and template based Multimedia Vehicle Repository (MVR) file by one or more creators and incorporating the principals of the present invention.

Fig. 2 is a representation of a framework in a streaming digital network for transporting MVR files to content creation stations in the network.

Fig. 3 is a representation of the network-based server in the system of Fig. 1.

Fig. 4 is a representation of a template used in the system of Fig. 1.

Fig. 5 is a representation of automatic, multi-stage Rich Content creation using the principles of Fig. 1.

Fig. 6 is a flow diagram for multi-stage creation of Rich Media Content using the system of Fig. 5.

## **DETAILED DESCRIPTION OF PREFERRED EMBODIMENT**

In Fig. 1, a Rich Media content Creation system 10 includes a capture device 12, typically an antenna linked to sources of raw Rich Media assets 13, i.e. video, stills, panorama,

sound, film for transmission to a storage medium 14, typically a disk linked to a network based server 16 using an authoring session manager 17 and a framework based streaming digital file. The raw Rich Media assets 13 are stored in the disk 14 for translation into a Multimedia Vehicle Repository (MVR) file by content creation stations as will be described hereinafter in connection

5 Fig. 5.

In Fig. 2, the streaming media assets 13 are transmitted in a framework 20 including a file header frame 22, a thumbnail frame 24, a meta frame 26, a media frame 28 and an end of sequence frame 30. The header frame 22 includes a frame header which provides information about the frame size types, flags and frame level. The header frame also includes media  
10 information containing definition on different media tracks that may be contained in the file. For general information in the header frame provides the class name of the code that renders immediate type on the client station.

The thumbnail frame 24 carries a minimalist representation of the information in the framework. For example, if the information carried in the file were a description of merchandize  
15 the thumbnail would carry a single image. Thumbnail frame is made possible providing the user a quick introduction to the subject with minimal code and data transfer. The thumbnail frame will also carry parameters producing image pan and animation effects on a single image.

A meta frame 26 carries specification of non-media specific information pertaining to enablement of hyperlink actions of media contents and tracking of media interaction.

20 Media frames 28 include a frame header and in addition contain media bitstreams initialization data, behavior data and code. The behavior data or initialization data defines the behavior in configuration of a corresponding media player. Media bitstreams data belong to a particular media track and can be carried over multiple frames and these frames can be

interleaved with meta frames and frames that belong to other media tracks. Media frames are identified by frame type and track identifier. A frame type and track identifier enables true multiplex delivery for static or dynamic proportioning of various media tracks over limited bandwidth. Media frames can also contain codes that render a media type on the client station.

- 5 The code in turn can be physically present or could be a URL reference. When present, the code is separated from the file on the server side and thereafter the code data can be made available for on-demand delivery. In the case of a URL reference to code, the code is sent from a remote HTTP server to be similarly made available on demand.

10 The end of sequence frame 30 contains a frame header and has a marker that signals the end of the entire presentation associated with the file.

The framework 20 is further described in Serial Number 09/268,537, *supra*.

15 In Fig. 3, the server 16, typically an IBM Apache web server, is linked through a network 19 to other content creation stations 14<sup>1</sup>... 14n. An authoring Graphical User Interface (GUI) 31 interacts with a kernel library 32, compression/decompression library 33, and processor programs 34 including an XML interpreter 35, a content manager 36, and a multi threaded re-entrant data link library 37. The processor programs 34 interact with a script/batch tool 38. The kernel library includes a server side MVR authoring tool which takes an XML specification along with raw media data or compressed media data as input to create a corresponding MVR-XML file. The codec library provides compression and decompression for the MVR-XML file.

20 The script/ batch tool 38 takes a template file prepared by an author and fills the template with actual data length provided the user to create the MVR-XML file. The service side content injection program 36 allows the user to add more information including non-media (business) to the MVR-XML file. The multi-threaded, re-entrant data link library 36 enables the authoring

session manager 17 (see Fig. 1) to multiplex creators/users (not shown) linked through the network 19 to access the MVR files on the disk 14.

Fig. 4 describes an electronic XML template 40 prepared by a creator/user for incorporating an MVR-XML file in the creation of executable Rich Media Content on a multimedia player. The template is populated by embedding dynamic variables or tags 42 and flow directives 43 in documents, the variables and flow directives comprising, at least in part, one or more names of raw Rich Media assets stored in the MVR-XML file. Any number of variables and flow directives may be placed within a template. The variables and flow directives may be embedded anywhere in the template including within the text, within XML tags and within other flow directives. The placement of one flow directive within another results in a nested flow directive structure. The template 40 is translated into a string table 44 comprising sets of variables for related Rich Media assets to be linked together as Rich Media Content. A populated template for an MVR-XML file is stored in the server and accessible by users coupled to the network. Alternatively, the template 40 and the string table 44 are inputted to the batch processing program 38 (See Fig. 3) which combines the various XML specifications 45, i.e. XML1, XML2, XMLn with the stored Rich Media Assets 13 to create an edited or composed MVR file 47<sup>1</sup>, <sup>2</sup>...<sup>n</sup> executable on the multimedia player.

In Fig. 5, a Rich Media Content creation station 500 includes a graphical stand alone authoring tool 502 and a creator/user 504 who acquire raw media assets from their sources for editing purposes. The creator/user composes the raw Rich Media assets into an edited MVR file; prepares an XML specification and electronic template incorporating the composed file and stores the edited MVR file, XML specification and template on the disk 14 via the network 19 (See Fig. 3).



In another instance, a text editing station 506 acquires raw media assets from the disk 14 via the session manager 507. A creator 508 prepares an XML template specification composing the raw Rich Media assets into an edited MVR file. The creator forwards the XML template specification to the server 16 via the session manager 507 which manages the access of the creator/users, of which there maybe several at different text editing stations, to the server 16 and the disk 14. The server executes the standard batch-processing program 38 (See Fig. 3) to combine the Rich Media assets into an edited or composed template based MVR file according to the accompanying XML specification. The composed or edited template based MVR file and the accompanying XML file are stored on the disk 14 as a combined file designated MVR-XML. The template based MVR-XML file may be automatically acquired via the network 19 by another Rich Media Content station 500' comprising a disk 14' linked to a server 16' incorporating a server content injection program 510. The program 510 acquires content from one or more databases 512, for example, business data and incorporates the data into the template based XMR-XML file. The modified XML specification content and the template when merged with the MVR file in the server by the batch processor results in a MVR-XML (modified creation) fil for storage on the disk 14'.

In like manner, the MVR-XML (modified creation) files stored on the disk may be automatically accessed by other content creation stations for changing or adding to the template which enables one content creation station to create a portion of an MVR file and a subsequent contact station(s) adding additional content ( ) (s) to obtain a final MVR file according to the desires of the content user groups.

Fig. 6, taken in conjunction with Fig. 2 – 5, describes a process 600 for multistage creation of Rich Media Content executable on a multi-media player, as follows:

Step 1. Rich Media assets are acquired from a media source(s) as a streaming digital file for storage on a disk 14 at a content development station 500.

Step 2. A creator 504 at a graphical altering tool acquires raw Rich Media assets from their source(s); prepares an XML specification, and composes the Rich Media assets into a XML  
5 template based MVR file.

Step 3. The template based MVR file and XML file are stored on the disk 14 at the content creation station 500 as a combined MVR-XML file for access by other content creation stations.

Step 4. A creator 508 at a text editing station 506 accesses the raw media assets stored on  
10 the disk 14; prepares an XML template for composing the raw media assets into a template based MVR file.

Step 5. The creator 508 transmits the raw media assets, the XML template and XML file to the server 16 which combines the raw media asset described in the template and XML file using the batch processing program stored in the server. The composed or edited template based  
15 MVR file template and XML file are stored in the server 14 as a combined MVR – XML file.

Step 6. Another content creation station 500' can automatically acquire the template based MVR-XML files from the disk 14 via an inter-linking network 19 for altering or modifying the MVR – XML file.

Step 7. A content injection program at the station 500' enables creators to access  
20 databases for incorporating other content into the acquired template based MVR-XMR file

Step 8. The new content is incorporated into the template by altering the template variables and flow directives. The altered template is transmitted to the server 16' for processing according to Step 5.

Step 9. The server 16' combines the template based XML file and raw media assets into an MVR-XML (modified creation) file for storage on the disk and access by other content creation stations. The process is repeated at other content creation station for creation of other embodiments of the raw media assets

5           Step 10. The MVR file may be downloaded to a multimedia player for execution of the raw media assets according to the desires of the content creators.

While the invention has been shown and described in conjunction with the preferred embodiment, various changes can be made without departing from the spirit and scope of the invention as defined in the appended claims, in which:

10       We claim:

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